



10 REASONS

TO CONSIDER RETRO-COAT
TO PROTECT YOUR
PROPERTY INVESTMENT

Is a Vapor Intrusion Coating Right For Your Property?

Vapor intrusion is an issue that is increasingly gaining attention. It occurs when there is migration of vapor-forming chemicals from any subsurface contaminant source into an overlying building. Recognition of soil vapor intrusion began in the 1980s with concerns over radon, but since then, there has been increasing awareness that chemicals such as chlorinated solvents and petroleum hydrocarbons in soil and groundwater can also pose an unacceptable risk to human health due to long-term exposure. In rare cases, the buildup of vapors, such as those from gasoline, may even cause explosive conditions.

“When vapor intrusion is detected, it becomes necessary to design a solution to mitigate the problem.”

When vapor intrusion is detected, it becomes necessary to design a solution to mitigate the problem. Retro-Coat, a chemically resistant coating designed to resist aggressive chemical vapors, is a cost-effective technology with many advantages over alternative options for existing structures and has been gaining popularity and acceptance in brownfield development as a cost-effective and less disruptive approach to effective vapor intrusion mitigation (VIM).



10 Reasons to Consider Retro-Coat VIM Coating to Protect Your Property Investment

A Great Vapor Mitigation Barrier For Existing Buildings



Retrofitting a Mitigation System Can Be Costly

Before a structure is built, there are many available VIM options that can be incorporated into the engineering design and installed during construction. However, once a building is already in place, retrofitting a mitigation system can be a costly and disruptive process. In addition, salvaging historic buildings and retro-fitting former manufacturing sites has been an increasingly lucrative approach for developers purchasing former brownfield properties.

Developed by experienced specialists specifically for VIM within existing structures, Retro-Coat is a chemically resistant coating that can be applied to various surfaces including, concrete, concrete masonry units (CMU), and brick, preventing vapor from passing through cracks and pores in concrete and into occupied spaces. It is resistant to trichloroethylene (TCE), perchloroethylene (PCE), and

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petroleum hydrocarbons, common contaminants that can often be found beneath building structures.

It contains no volatile organic compounds (VOCs) and has a fast curing time which minimizes disruption to ongoing businesses. Unlike active sub-slab systems, Retro-Coat does not require the removal of the existing slab. In cases where an existing building already has an active sub-slab depressurization system (SSD), Retro-Coat can either enhance its performance or contribute to its retirement.

#2 Consider Retro-Coat as an Engineering Control



Demonstrated Ability to Serve as an Engineering Control

Environmental issues are not only limited to subsurface contamination, but can also include historical building materials and contamination found within existing building slabs. Finding a cost-effective, and regulatory-approved, approach to mitigate these potential environmental issues can be an important step in a successful redevelopment project. Fortunately, there are a variety of steps property owners and developers can take to ensure they avoid having to demolish and dispose of historical buildings and building materials, including an innovative approach of encapsulating contaminants such as PCBs, hexavalent chromium, and chlorinated solvents.

The physical properties of Retro-Coat, including tensile strength and flexural strength demonstrate its ability to serve

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as an engineering control. Retro-Coat has previously been approved by regulators to serve as the remedial measure to eliminate the direct contact exposure in a residential building. Retro-Coat ensured the safety of residents and workers while not impacting the operations at the building.

A standard application of Retro-Coat, at only 26 mil thickness, is typically completed in three coats and the coats can be applied in individual colors. The contrasting colors of the primer and Retro-Coat, can serve as demarcation and allow for the identification of wear over time, prompting repairs if needed and ensuring long-term protection.



CASE STUDY: Retro-Coat Restores Indoor Air Quality at Jazz Club

A former jazz club in Renton, Washington had significant indoor air quality issues due to the activities of a neighboring dry cleaner. Concentrations of PCE and carbon tetrachloride exceeded the Washington State Department of Ecology guidelines. Due to the air quality issues, the owner was unable to either sell or lease the property.

After researching their options, the environmental consultant (Maul Foster & Alongi) and the property owner, selected Retro-Coat over a SSD system because it was cost-effective and could be installed quickly. Since Retro-Coat was installed, the vapor intrusion issues have been eliminated and the building is the process of being sold.



MAUL
FOSTER
ALONGI

#3

Retro-Coat Provides a New Decorative Finish to Existing Flooring



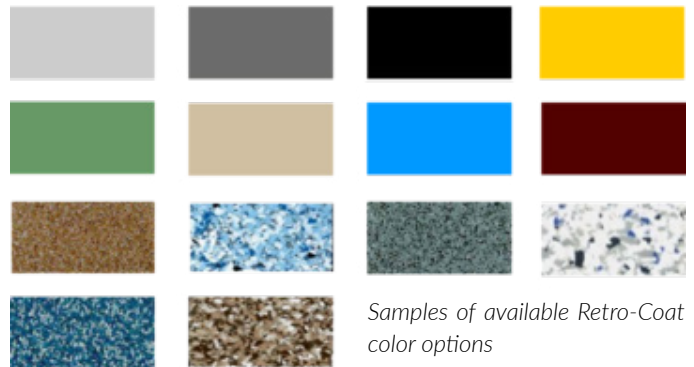
“Retro-Coat can dramatically improve and refresh the appearance of a room...”

A Variety of Finishes Offered

Retro-Coat finishes to a high gloss and easy-to-clean surface that is impervious to vapor and moisture transmission. Retro-Coat is available in a variety of colors, allowing for a multitude of design choices. A drab concrete can be upgraded to a solid bright color or a speckled pattern, refreshing the aesthetic of a room.

In addition, other additives or materials can be added to achieve a desired performance (i.e. aggregate for a non-slip surface) or a custom aesthetic. Retro-Coat is also a wearing surface, designed to resist abrasion. If desired, carpet, tile, linoleum or other floor coverings can be applied directly over the Retro-Coat. In one case, Retro-Coat was used in a gymnasium and lines for a basketball court were drawn over top of it.

With different color options and an attractive new finish, Retro-Coat can help to dramatically improve and refresh the appearance of a room and contribute to the overall feel of a space.



Samples of available Retro-Coat color options



“Retro-Coat is a valuable tool for developers preferring to reuse existing components and structures...”

A Viable VIM Solution for Historic Structures

Historic structures often have surfaces that have acquired a patina over time, whether it is weathered concrete, brick, or oxidation of metal surfaces. These patinas provide the building with a unique, desirable, and antique aesthetic that may not be replicated with new construction techniques. Often times, there is a drive to preserve these patinas and building components where the structure is historically or architecturally significant.

Land Science has been involved in the conversion of former manufacturing facilities and historic mills into mixed-use

properties where the developer wanted to keep as much of the existing structures in tact as possible, including large wood and steel beams, brick walls, the existing foundation and concrete slabs. Retro-Coat was a valuable tool for those developers who preferred to reuse existing components and structures, but also needed to incorporate a vapor intrusion barrier or engineering control on their property for the safety of future tenants and occupants.

Available in a variety of colors and finishes, Retro-Coat can be used to provide a durable, and easy-to-clean coating that will protect and enhance a structure’s patina while simultaneously preserving the historic aesthetic.

#5

Retro-Coat is Extremely Durable



Designed to Withstand Industrial Environments

Retro-Coat is a traffic bearing surface, and does not need a protective course or additional concrete placed on top of the system. The Retro-Coat system was engineered to withstand forklift traffic and other machinery, making it suitable, and in many cases the ideal mitigation strategy, for industrial applications and manufacturing settings. Upon installation,

“ Upon installation, the tensile strength properties of the Retro-Coat system effectively double the strength of the concrete slab... ”

the tensile strength properties of the Retro-Coat system effectively double the strength of the concrete slab, achieving 9800 psi per ASTM D-638.

Retro-Coat can be customized to meet aesthetic needs of manufacturing clients, signifying forklift traffic zones, manufacturing bays, and aisle-ways.



“ Once applied, Retro-Coat achieves an orders of magnitude reduction similar to those of SSD systems... ”

Works on a Variety of Vertical Surfaces

Vapors can enter a building not just from the slab below but also from the walls. Achieving a tight seal from the floor to the foundation walls is an important part of the effectiveness of any vapor barrier, but the walls, often made of porous concrete, can themselves be an entry point for unwanted vapors. When it comes to putting together a comprehensive solution for vapor intrusion, a chemically resistant coating that can be vertically applied is a very useful tool.

Unlike other vapor barrier options, Retro-Coat can be roller-applied to vertical services without sagging at ambient conditions. It can also adhere to a variety of vertical surfaces such as metal, wood, or concrete.

For example, a historic building had vapor intrusion originating from a former underground storage tank (UST) and a nearby

dry cleaner. Indoor air samples showed chlorinated solvent levels above applicable local guidelines. The building use was mixed-use so indoor air concentrations needed to meet both residential and commercial screening levels. Additionally, because the building was built in 1907, there were physical challenges based on existing obstructions and limited knowledge about its construction.

Retro-Coat was selected to mitigate vapor intrusion and was applied to the floor and wall, which was composed of permeable concrete masonry units. Once applied, Retro-Coat achieves an orders of magnitude reduction similar to those of SSD systems without the need to operate and maintain a mechanical system, having successfully prevented vapors from migrating into the building through all surfaces both vertical and horizontal.



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Quick Installation Minimizes Disruption To Existing Businesses



Quick Installation Reduces Downtime

With quick curing times and simple application procedures, Retro-Coat can be installed very quickly, especially in comparison to mechanical systems such as SSD. A Retro-Coat application can typically be completed within a couple of days.

A quick turnaround time is important and reduces building downtime, operational and production interruptions, residential disturbances, and contractor costs. A timely application process can help ensure contractors meet demanding construction schedules.

At a residential site in Virginia, vapor intrusion issues affected the interior living space of a private building due to the release of heating oil from an aboveground storage tank (AST) to the sub-slab environment. Indoor air sampling revealed several petroleum compound contaminants at concentrations above

“ A timely application process can help ensure contractors meet demanding construction schedules... ”

Environmental Protection Agency (EPA) residential screening levels.

Retro-Coat was selected because of its quick installation time, which minimized the period that the homeowners needed to be displaced. Retro-Coat was installed alongside an active sub-slab VIM system consisting of vertical vent wells. The VIM system reduced the levels of petroleum compounds in the indoor air to the extent that the building was suitable for occupancy just six weeks after system startup.



Consider factors like Carbon Footprint of all VIM Methods

The environmental impact of a VIM strategy is not limited to just the indoor air quality. When comparing VIM options, it is also important to look at factors such as carbon footprint and overall sustainability. Compared to other VIM methods, Retro-Coat is quite environmentally sustainable.

Compared to other VIM methods, Retro-Coat is environmentally sustainable. Retro-Coat is a passive system that does not have any mechanical components, therefore minimizing energy requirements and any additional emissions that might arise from fuel consumption and general operation. By contrast, a mechanical system such as ventilation will have operating blowers and air that must be heated or cooled, all of

“Retro-Coat is a passive system that does not have any mechanical components...”

which generate greenhouse gases and have energy costs that will accrue as it continues to operate.

As well, Retro-Coat does not require the removal and disposal of soil or slab which requires the operation of removal equipment and transportation to landfills which can add to the carbon footprint of the overall project.

When comparing options for VIM, it is important to consider both cost and effectiveness, but the environmental sustainability of the solution is not a factor that should be overlooked.

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Eliminates Hauling and Disposal Costs Related to Concrete Slab Removal



“ Retro-Coat was designed to be installed in existing buildings... ”

Cost-Savings and Greener Approach Make it An Attractive Option

Retro-Coat was designed to be installed in existing buildings with minimal disturbances to the infrastructure. It is applied over existing surfaces to prevent vapor intrusion migration, eliminating the need to cut into any of the underlying slab structure.

As a result, there is no need for the hauling and disposal of the removed slab which can represent significant costs, especially if there is a large distance to the nearest suitable landfill.

The cost of removing concrete slab can vary significantly per square foot depending on hauling and disposal costs, the location of the slab, contaminants within the concrete, and the job size and location. This cost alone can be more than the square footage cost of installing Retro-Coat.

By simply eliminating the need to remove the concrete slab, the overall costs of a vapor barrier project can be favorable when compared to that of a SSD system.



Enhance the Performance of Active and Passive Systems

In some cases, the installation of a vapor barrier alone is insufficient. In these situations, a vapor barrier can be used in combination with an active mitigation system or a passive venting system. There are some US states where this is actually a requirement for any VIM solution.

When utilized correctly, Retro-Coat can enhance the performance of both active and passive VIM systems.

In Michigan, an agricultural, construction, and industrial equipment parts manufacturing facility was slated to open in a 265,000 square foot facility that had suspected environmental and vapor intrusion concerns resulting from years of previous on-site activities. TCE was present on site and was treated using RegenOx®, an injectable chemical oxidation technology. However, a vapor intrusion condition was identified and mitigation was required. Retro-Coat was selected for usage in conjunction with a Vapor-Vent, a low-profile venting system that can be used in lieu of slotted PVC pipe and installed very quickly. Vapor-Vent was installed as part of an active SSD system. Retro-Coat was installed along

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with a broadcasted aggregate to provide a non-slip surface. By utilizing the two mitigation approaches, the number of SSD points and the total area requiring a barrier coating were reduced, saving both time and money.

While Retro-Coat is an excellent standalone option, when utilized properly, it can improve and be improved by other VIM options, both passive and active.

Installing a VIM system into an existing building can be expensive and disruptive, particularly with active systems that require the removal of concrete slab and constant maintenance. Retro-Coat can be installed quickly and works passively to prevent the migration of vapors into an occupied space, protecting human health in an environmentally sustainable way.

Cost-effective, aesthetically pleasing, and customizable, Retro-Coat is an excellent option that should be considered as part of any VIM strategy.



Solutions Provided in This eBook Include:



Retro-Coat™ Vapor Intrusion Coating

Retro-Coat™ provides a simple and proven solution to a complex problem. Applying Retro-Coat can provide a building owner with long-term assurance that the vapor intrusion risk has been successfully mitigated, while at the same time, reducing the overall mitigation cost and avoiding the need to alter the building's foundation.

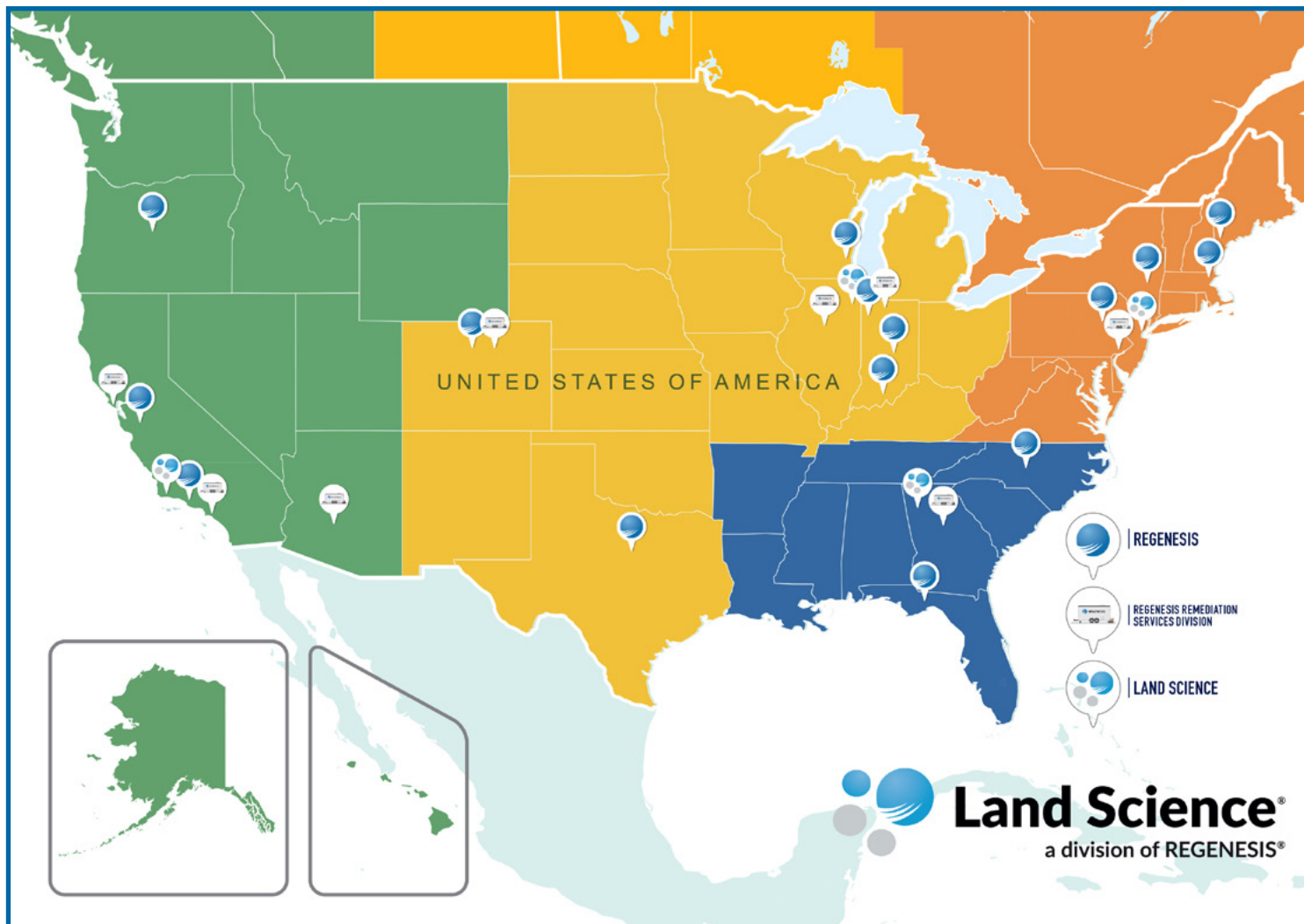
Vapor-Vent™ Vapor Collection System

Vapor-Vent™ is a low profile vent system that can be used in lieu of slotted PVC pipe. The speed of installation and the proximity of the vent to the barrier provide cost savings and performance benefits compared to other technologies.

REGEN Ox

RegenOx® is an injectable, two-part ISCO reagent that combines a solid sodium percarbonate based alkaline oxidant (Part A), with a liquid mixture of sodium silicates, silica gel and ferrous sulfate (Part B), resulting in a powerful contaminant destroying technology.

Land Science Is Ready To Assist You In Determining The Right Solution For Your Site



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